REMARKS

This application has been reviewed in light of the Office Action dated October 17, 2003. Claims 1-67 are pending in this application. Withdrawn Claims 1-9, 25, 29, 48-50, 53, 57-59, and 62 have been amended as to matters of form only; these claims will become allowable upon the allowance of linking Claims 29, 36, 37, and 44, as stated at page 2 of the Restriction requirement dated November 20, 2002. Claims 10-17, 19, 20, 22, 23, 30-32, 34-47, 51, 52, 54, 55, 56, 60, 61, and 63-67 have been amended to define still more clearly what Applicants regard as their invention. Claims 1, 6, 9, 10, 12, 20, 25, 30, 35, 46, and 48-65 are in independent form. Favorable reconsideration is requested.

First, Applicants gratefully acknowledge the allowance of Claims 20-24, 30-34, 46, 54, 56, 63, 65, and 67 and the indication that Claims 13, 14, 36-38, 41, 42, 44, and 66 include allowable subject matter and would be allowable if rewritten in proper independent form. Claims 13, 14, 36-38, 41, 42, 44, and 66 have not been so rewritten at this time because, for the reasons given below, their base claims are believed to be allowable.

The Office Action rejected Claims 10, 11, 35, 39, 51, 55, 60, and 64, under 35 U.S.C. § 102(b) as being anticipated by "Region Growing and Region Merging Image Segmentation" (Ikonomakis et al.); rejected Claims 12, 15-18, 40, 43, 52, and 61 under 35 U.S.C. § 103(a) as being unpatentable over Ikonomakis et al. in view of "Seeded Region Growing" (Adams et al.); and rejected Claims 19, 45, and 47 as being unpatentable over Ikonomakis et al. and Adams et al., in view of "Image Segmentation and Approximation Through Surface Type Labelling and Region Merging" (Lim et al.). Applicants respectfully traverse these rejections.

Initially, Applicants note that Claim 47 has been amended to depend from allowed Claim 45; thus Claim 47 is now allowable.

Applicants also note that Claims 10, 12, 35, 51, 52, 55, 60, 61, and 64 recited a "subset" of pixels, which was intended to mean "a part of a larger group of related things". However, since the Office Action interprets the "subset" as including "the set itself", Applicants have amended Claims 10, 12, 35, 51, 52, 55, 60, 61, and 64 to clarify that a reduced number of neighboring pixels are considered when selecting a pixel to add to the growing region. Furthermore, the Office Action at page 2 asserts that Ikonomakis et al. discloses updating "the property of the region" to which a pixel has been appended. Applicants disagree with this interpretation. In Ikonomakis et al., the property of the region remains unchanged. That is, the property of the appended pixel is changed to match the property of the region to which it is appended (i.e., the value of the original seed pixel). Nevertheless, Claims 10, 12, 35, 40, 51, 52, 55, 60, and 61 have been amended to clarify the updating of the property of the region.

Applicants submit that amended independent Claims 10, 12, 35, 51, 52, 55, 60, 61, and 64, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art at least for the following reasons.

The aspect of the present invention set forth in Claim 10 is a method of segmenting an image, the image comprising a plurality of pixels. The method includes the steps of allocating one or more pixels as seeds, growing regions from the seeds so as to segment the image into regions, where a number of pixels that border the regions are considered, the number being smaller than a total number of pixels that border the regions. The considered pixel that is most similar in a property to a region bordered by the considered pixel is appended to the region to form an expanded region and the property of

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the expanded region is updated, and the growing step is repeated until no pixels bordering the regions are available.

One notable feature of Claim 10 is growing regions from the seeds so as to segment the image into regions, where a number of pixels that border the regions are considered, the number being smaller than a total number of pixels that border the regions, and the considered pixel that is most similar in a property to a region bordered by the considered pixel is appended to the region to form an expanded region and the property of the expanded region is updated.

Applicants submit that Ikonomakis et al. is silent as to considering a number of pixels bordering the regions, the number being smaller than a total number of pixels bordering the regions. In addition, in Ikonomakis et al., the growing region retains the property of the original seed pixel. When a pixel is added to a region, the property of the added pixel is changed to equal the property of the seed pixel of the region. Applicants submit that Ikonomakis et al. is silent about appending a considered pixel to a region to form an expanded region and updating the property of the expanded region, as recited in Claim 10.

Applicants submit that at least for these reasons, Claim 10 is patentable over Ikonomakis et al.

Independent Claims 51 and 60 are, respectively, an apparatus and a computer program product claim corresponding to Claim 10, and are believed to be patentable for at least the same reasons as discussed above in connection with Claim 10.

Claim 35 includes the same feature of a growing step, as discussed above in connection with Claim 10. Accordingly, Claim 35 is believed to be patentable for at least the same reasons as discussed above in connection with Claim 10. In addition,

Claims 55 and 64 are, respectively, an apparatus and a computer program product claim corresponding to Claim 35, and are therefore believed to be patentable for at least the same reasons as discussed above in connection with Claim 35.

Claim 12 is patentable over the cited prior art at least because it includes the steps of (b) generating a list of pixels that border the regions, and (c) scanning a subset of pixels in the list of pixels, the number of pixels in the subset being smaller than the number of pixels in the list". As discussed above with reference to Claim 10, Ikonomakis et al. performs a neighbor comparison step for every pixel assigned to a region. The neighbor comparison test is described as relating to all neighboring pixels. Applicants submit that nothing in Ikonomakis et al. would teach or suggest scanning only a strict subset of the pixels that border the growing regions.

Adams et al., as understood by Applicants, relates to Seeded Region Growing. When adding pixels to the growing regions, Adams et al. considers T, which is the set of all as-yet-unallocated pixels which border at least one of the regions. As described, for example, on page 642, column 2, Adams et al. selects a pixel Z which is an element of T having a minimum difference measure of all the elements of T. Applicants submit that nothing has been found in Adams et al. that would teach or suggest the steps of generating a list of pixels that border the regions, and scanning a subset of pixels in the list of pixels, the number of pixels in the subset being smaller than the number of pixels in the list, as recited in Claim 12.

Applicants submit that at least for this reason, Claim 12 is patentable over the cited prior art, when taken separately or in any proposed combination.

Independent Claims 52 and 61 are an apparatus and computer program product claim, respectively that correspond to method Claim 12, and are believed to be patentable for at least the same reasons as discussed above in connection with Claim 12.

A review of the other art of record, including Lim et al., has failed to reveal anything that, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as applied against the independent claims herein. Therefore, those claims are respectfully submitted to be patentable over the art of record.

The other rejected claims in this application depend from one or another of the independent claims discussed above, and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

This Amendment After Final Action is believed to place this application in condition for allowance and, therefore, its entry is believed proper under 37 C.F.R. § 1.116. Accordingly, entry of this Amendment After Final Action, as an earnest effort to advance prosecution and reduce the number of issues, is respectfully requested. Should the Examiner believe that issues remain outstanding, it is respectfully requested that the Examiner contact Applicants' undersigned attorney in an effort to resolve such issues and advance the case to issue.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

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